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EXTRACTION OF COPPER AND NICKEL FROM SOLUTIONS FOLLOWED BY EXTRACTION OF NICKEL WITH DIMETHYLGLYOXIME



Shodiev Abbas Ne'mat ugli

DSc, Associate Professor, Karshi Engineering-Economics
Institute, Head of the Department of Mining,
Karshi, Uzbekistan



Gayratova Madinabonu Zakhridin kizi

Student of Karshi Engineering-Economics Institute,
Karshi, Uzbekistan

Abstract. Nickel has many excellent properties including ductility, corrosion resistance, magnetism, stability and high temperature stability which plays an important role in the development of key industries. Accordingly, at the first stage of the research, the direction of research, the possibilities of extracting metals from solutions by ion flotation and extraction were determined, and mother liquors of the vitriol workshop were selected. The chemical composition of the mother liquor of the vitriol plant was determined as a result of the research, the use of naphthenic acid in ion flotation and the dependence of the duration of flotation on the extraction of metal, as well as the methodology of its extraction, were drawn up.

Keywords: sulfur, nickel, naphthene, acid, alkali, flotation, technology, pyrometallurgy, enrichment.

ERITMALARDAN MIS VA NIKELNI AJRATIB OLISH, NIKELNI DIMETILGLIOKSIM BILAN AJRATIB OLISH

Shodiyev Abbas Ne'mat o'g'li

Qarshi muhandislik-iqtisodiyot instituti Konchilik kafedrası
mudiri, DSc, dotsent,
Qarshi, O'zbekiston

G'ayratova Madinabonu Zaxridin qizi

Qarshi muhandislik-iqtisodiyot instituti talabasi,
Qarshi, O'zbekiston

Annotatsiya. Nikel ko'plab ajoyib xususiyatlarga ega, shu jumladan egiluvchanlik, korroziyaga chidamlilik, magnitlanish, barqarorlik va yuqori harorat barqarorligi, bu asosiy sanoatning rivojlanishida muhim rol o'ynaydi. Shunga ko'ra, tadqiqotning birinchi bosqichida tadqiqot yo'nalishi, ionli flotatsiya va ekstraktsiya yo'li bilan eritmalardan metallarni ajratib olish imkoniyatlari aniqlanib, vitriol sexining o'simlik yog'i eritmalari tanlab olindi. Tadqiqotlar natijasida vitriol o'simligi yog'ining kimyoviy tarkibi aniqlandi, ion flotatsiyasida naften kislotasidan foydalanish va flotatsiya davomiyligining metall ekstraktsiyasiga bog'liqligi, shuningdek uni olish metodologiyasi ishlab chiqildi.

Kalit so'zlar: oltingugurt, nikel, naften, kislota, ishqor, flotatsiya, texnologiya, pirometallurgiya, boyitish.

ЭКСТРАКЦИЯ МЕДИ И НИКЕЛЯ ИЗ РАСТВОРОВ С ПОСЛЕДУЮЩЕЙ ЭКСТРАКЦИЕЙ НИКЕЛЯ ДИМЕТИЛГЛИОКСИМОМ

Шодиев Аббас Неймат Угли

*Заведующий кафедрой горного дела Каришинского инженерно-экономического института, доктор технических наук, доцент,
Кариши, Узбекистан*

Гайратова Мадинабону Захриддин кизи

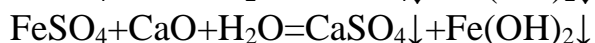
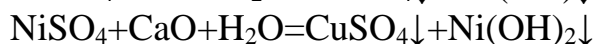
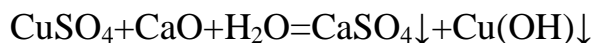
*Студент Каришинского инженерно-экономического института,
Кариши, Узбекистан*

Аннотация. Никель обладает многими прекрасными свойствами, включая пластичность, коррозионную стойкость, магнетизм, стабильность и устойчивость к высоким температурам, что играет важную роль в развитии ключевых отраслей промышленности. Соответственно, на первом этапе исследования были определены направление исследований, возможности извлечения металлов из растворов методом ионной флотации и экстракции, а также выбраны маточные растворы цеха витриола. В результате исследований был определен химический состав маточного раствора витриольного цеха, разработано использование нафтенной кислоты в ионной флотации и зависимость продолжительности флотации от извлечения металла, а также методика его извлечения.

Ключевые слова: сера, никель, нафтенны, кислота, щелочь, флотация, технология, пирометаллургия, обогащение.

Introduction. Previous experiments have shown that the separation of nickel from copper using naphthenic acid and sodium DEDTC did not yield positive results. In this regard, we conducted a series of experiments on the possibility of separate precipitation of copper from nickel using CaO.

Neutralization and precipitation of copper with CaO



Processing methods. We carry out the further extraction of nickel in the following devices: for precipitation of copper by neutralization with lime, a simple powder with a stirrer is used, and also for the extraction of nickel we use a column type extractor, which has the following advantages:

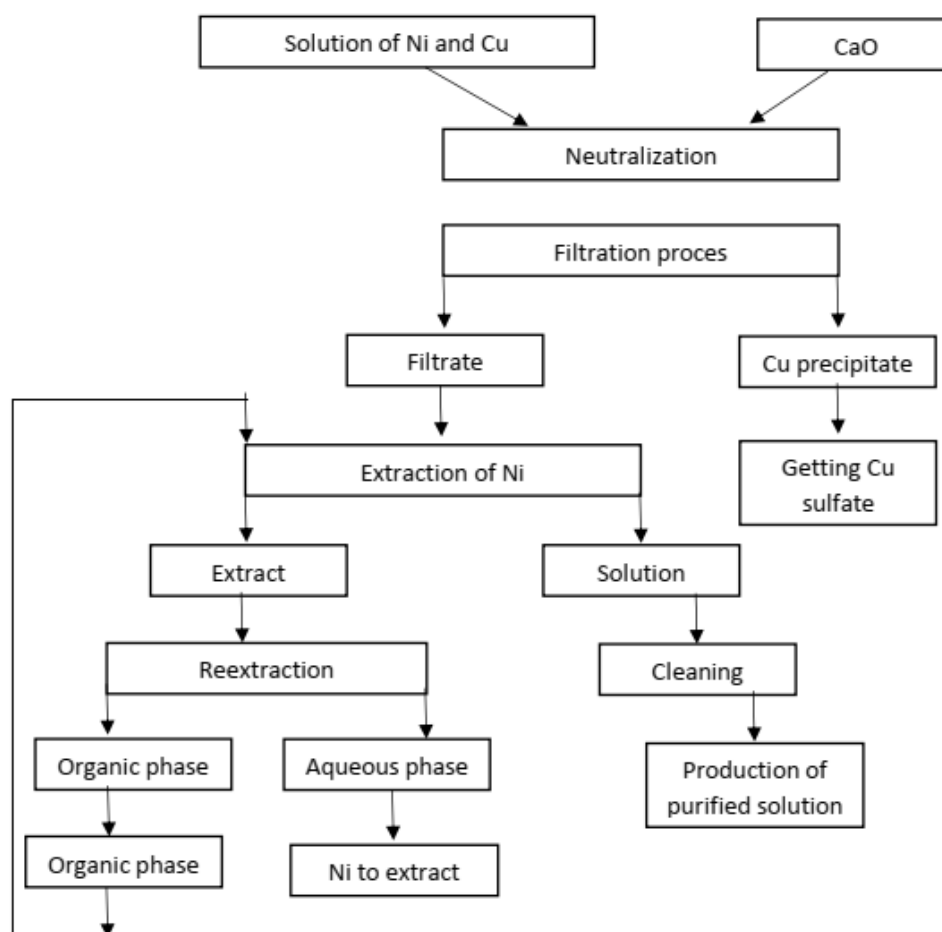
- column extractors are preferred for separation of metal ions; sediment particles are less affected by sedimentation due to low turbulence of currents; the possibility of maintaining a high particle-bubble aggregate;

- relatively low capital costs and redistribution costs;

Reagents for copper deposition were prepared for the experiments. Experiments on the efficient separation of copper and nickel were carried out according to the following scheme shown in picture 1.

The dependence of copper deposition on reagent consumption, pH and deposition time was studied. The experimental results are shown in Pic. 2. and in the table. 1.

Results and discussion. According to the scheme, the solution is sent to a mixing reactor, lime solution is added to it, and copper ions are precipitated under the



Picture 1. Scheme of separation of Ni and Cu by precipitation and extraction method.

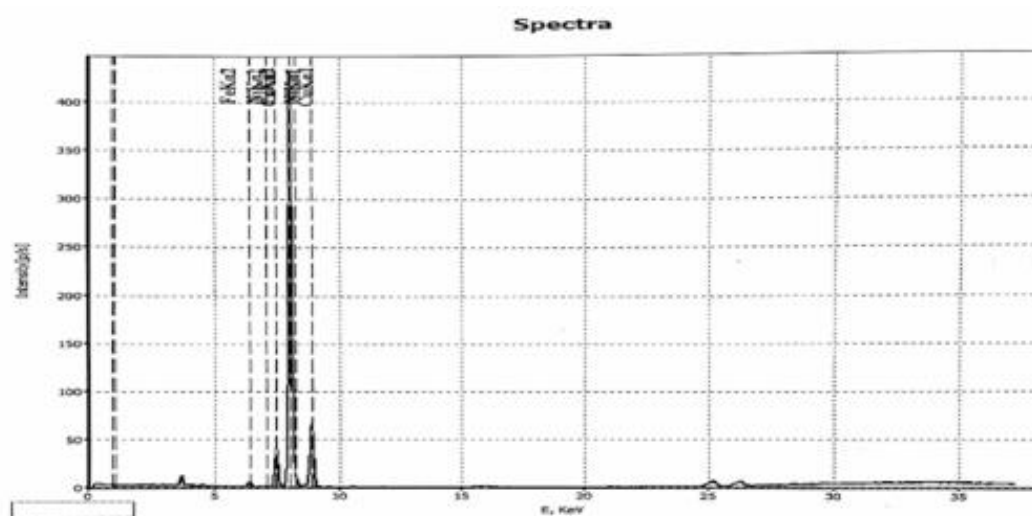
Table 1.

The effect of CaO consumption on Cu deposition

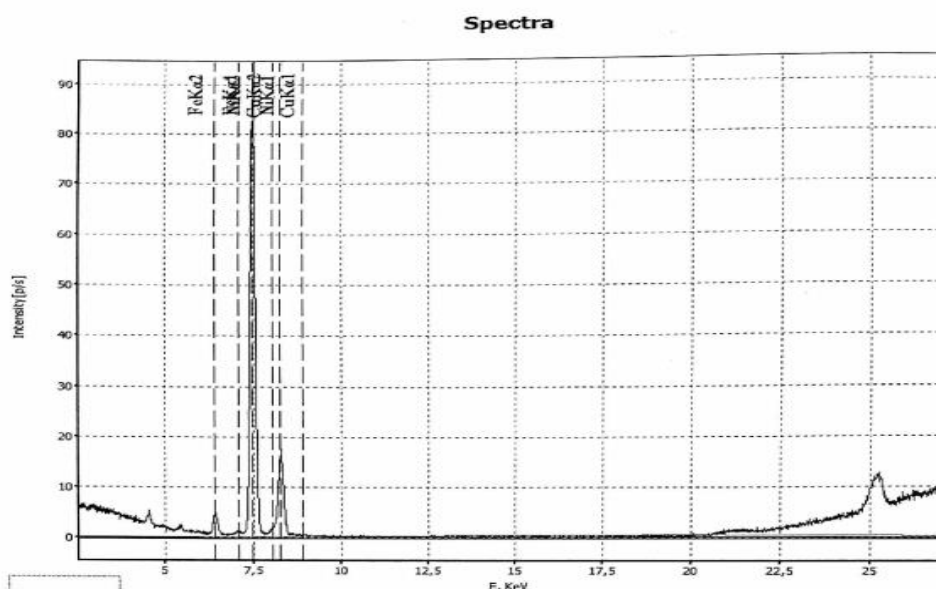
№	CaO consumption,gr	Sediment mass,gr	Amount of Cu in sediment, %	Segregation of Cu, %
1	20	52.4	4.77	4
2	30	77.6	4	5
3	40	104.7	4.8	8
4	50	140.6	8.9	20
5	60	184	13.6	40
6	70	242	19.1	74
7	80	282.3	20.3	92
8	90	314.3	19.9	100

necessary acidic conditions. Solutions from the mixing reactor are sent to the extractor to obtain complex metal compounds with dimethylglyoxime. Air is supplied to the

process through a compressor. Solutions from the extractor are sent to the collection of purified wastewater and from there returned to production. The foam formed



Picture 2. Deposition spectra of liquid precipitated using CaO.



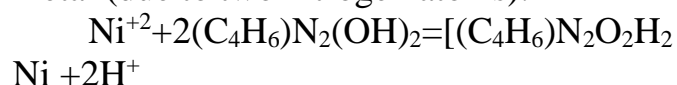
Picture 3. After precipitation with CaO, the solution is filtered and the filtrate spectrum.

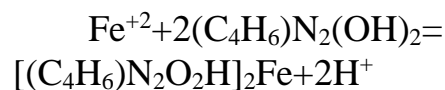
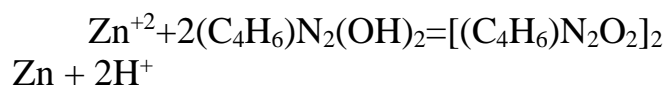
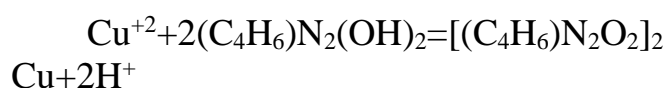
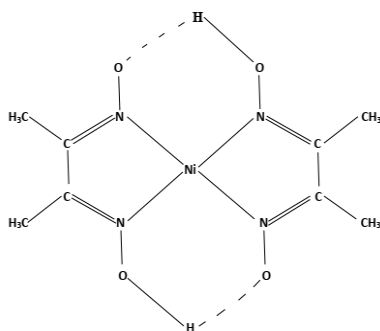
during the extraction process is sent to the collector. After the foam is collected in the foam collector, it is sent to a drum vacuum filter for filtration, and then sent to further processing.

Qualitative analysis of the X-ray fluorescence analysis of the solution and the precipitate can be seen in Pic. 2, 3 and 4 that when precipitated with CaO solutions, the precipitate transfers the main part of copper to the precipitate, and the solution increased

nickel 7.5 KeV is sent in the absorption zone. It is extracted to obtain a rich nickel solution.

The nickel ion is bound to two molecules of dimethylglyoxime, and each of them forms not one, but two bonds with the metal (due to two nitrogen atoms).





Conclusions. Further extraction and re-extraction laboratory experiments showed a high recovery of metals from solutions, while copper was separated by precipitation, where the conversion of copper to sediment was about 19.1%, with a sediment content of 99%. and the initial content of the recovery

Table 2.

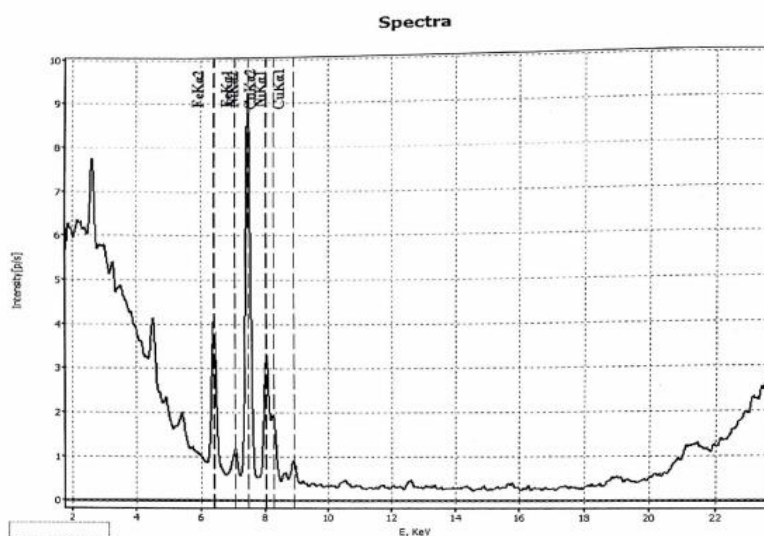
Desorption of Ni mixed with keratin at different pH conditions

№	pH	Ni separation, %
1	5	30
2	6	42
3	7	60
4	8	82
5	8.5	98

Table 3.

Nickel recovery, %

№	Extractant consumption %	Ni separation
1	100	70.5
2	125	82.4
3	150	98.7



Picture 4. Spectra of solutions of obtained solutions Precipitation of copper with lime.

solution was 91%. The obtained data can be | industrial conditions after laboratory tests.
the basis for the use of this scheme in semi-

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